

## **CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

### **MARK SCHEME for the October/November 2015 series**

#### **9608 COMPUTER SCIENCE**

**9608/22**

Paper 2 (Written Paper), maximum raw mark 75

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- 1 (i) 2 [1]
- (ii) 7.5 [1]  
Accept: 7 ½
- (iii) FALSE [1]
- (iv) TRUE [1]
- (v) ERROR [1]

2 (a)

	Inputs		Output
Test Case	P	Q	X
1	1	1	<b>1</b>
2	1	0	<b>0</b>
3	0	1	<b>0</b>
4	0	0	<b>0</b>

[1]

[1]

[1]

[1]

(b)

```
IF P = 1 AND Q = 1
  THEN
    X ← 1
  ELSE
    X ← 0
ENDIF
```

```
IF P = 0 OR Q = 0
  THEN
    X ← 0
  ELSE
    X ← 1
ENDIF
```

**Mark as follows:**

**Structure:** IF – THEN – ELSE – ENDIF [1]

**Condition:** P = 1 AND Q = 1 [1]

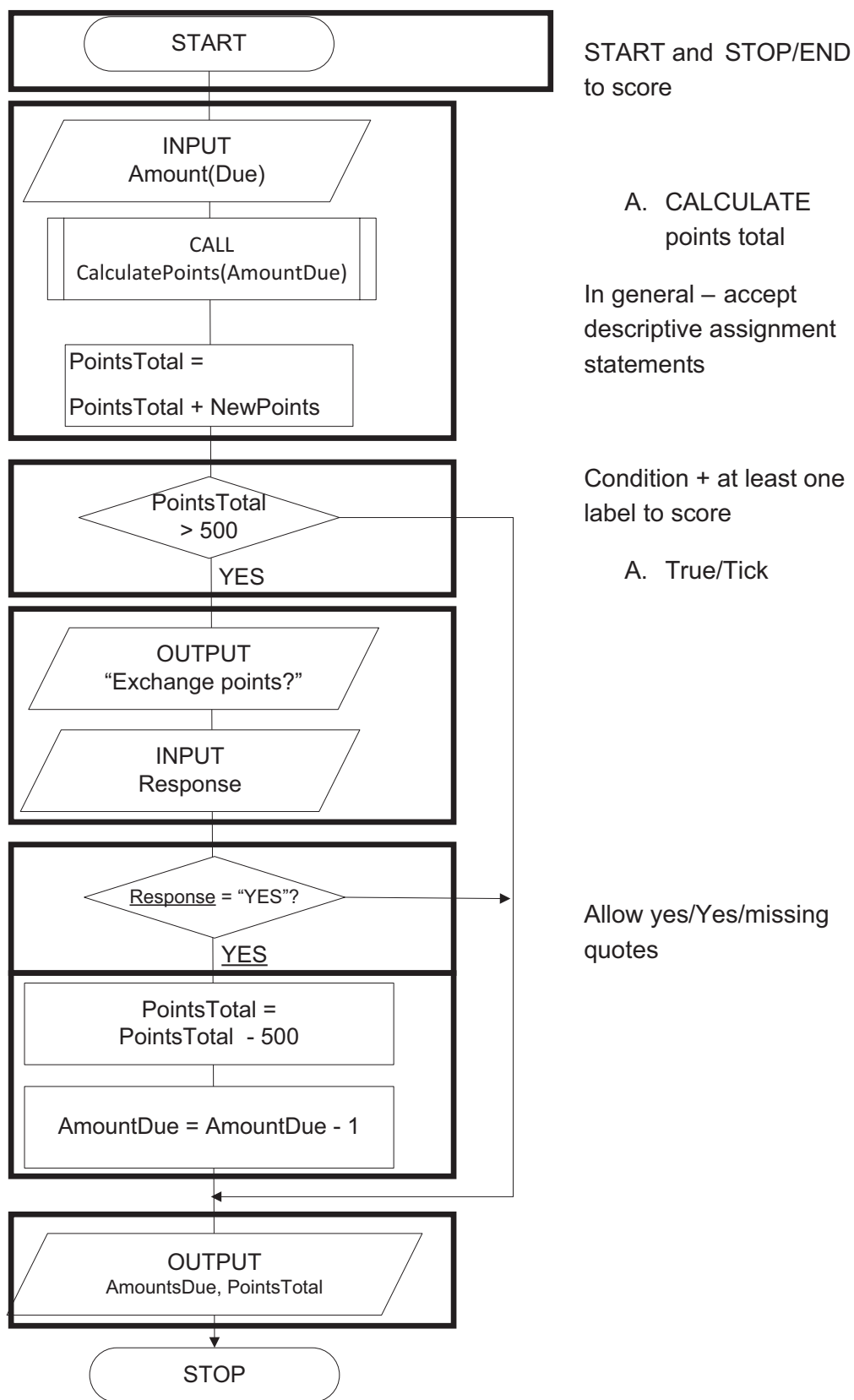
Allow &/&& for the operator

**Logic:**  $\left. \begin{array}{l} X \leftarrow 1 \text{ (for TRUE)} \\ X \leftarrow 0 \text{ (for FALSE)} \end{array} \right\}$  [1]

Check carefully for:

- other alternative correct algorithm
- a ‘mirror copy’ of the question paper algorithm – score 0

3



[Max 6]

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- 4 (a) The combination of suit and card number // the 'pair' of numbers // the pair of random numbers .... [1]  
There will be duplicates/repeats//not all cards will be drawn [1]
- (b) (i) 32 // 33 [1]  
(ii) 27 // 28 [1]  
(iii) 08 [1]  
(iv) 12 // 13 [1]
- (c) 1 [1]
- (d) DealCount <> 52 // NewCard = FALSE  
Allow: Inclusion of the WHILE [1]
- (e) Test has the card has already been drawn? [1]  
Set value TRUE for this card entry (in the array)/this card [1]  
Flags that this is the first time this card has been drawn // decides if another card must be generated [1]  
Outputs the new card value [1]
- [Max 2]
- (f) CardPack ARRAY[1:4 , 1:13] OF/:/AS BOOLEAN [1]  
Allow: parentheses
- (g) **Pseudocode ...**  
(SELECT) CASE (OF) CardValue + ENDCASE [1]  
    (CASE) 1: CardName ← "Ace" 1 mark for any one correct [1]  
    (CASE) 11: CardName ← "Jack"  
    (CASE) 12: CardName ← "Queen"  
    (CASE) 13: CardName ← "King" (final three cases ...) [1]  
    OTHERWISE (/ELSE) CardName ← CardValue //  
    (CASE) 2 TO 10: CardName ← CardValue [1]  
ENDCASE // ENDSELECT

Note: Must be double quotes present and correct case

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### **Visual Basic**

Select Case CardValue

Case 1

CardName = "Ace"

Case 11

CardName = "Jack"

Case 12

CardName = "Queen"

Case 13

CardName = "King"

Case Else // Case 2 to 10

CardName = Str(CardValue) [4]

End Select

Allow: omission of Str

5 (a) (i)

N	i	j	Temp	1	2	3	4	5
				11	16	13	7	8
5								
	1	1						
		2			13	16		
		3				7	16	
		4					8	16
		5						
	2	1						
		2			7	13		
		3				8	13	
		4						
	3	1		7	11			
		2			8	11		
		3						
	4	1		<i>final values are:</i>				
		2		7	8	11	13	16

Terminates at 5 and 4 respectively

Must be:

- Preceded by other entries ...
- nothing after the 1, 2 sequence

Note these final values will not be shown on the same row ...

[8]

(ii) To sort / to order/put in ascending order the items (in the array) [1]

(iii) There were no swaps on the last pass / on pass 4 [1]

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(b)

Identifier	Data Type	Description
Num		
N	INTEGER	The number of numbers in the list
i	INTEGER	Loop counter // The number of 'passes' up through the list
j	INTEGER	The <u>index</u> // position in the array
Temp	INTEGER	Description must imply/states the 'swapping' operation

Mark as follows:

INTEGER × 4

One mark per description

[1]

[4]

6 (a) (i) 12

[1]

(ii) 'L'

[1]

Note: quotes are optional – must be upper case L

(b) (i)

Identifier	Data Type	Description
InputString	STRING	The string value input by the user
i	INTEGER	<u>Loop</u> counter // (index) position of an individual character
j	INTEGER	Number of characters in / length of InputString
NextChar	CHAR//CHARACTER	(Single) character within InputString / from string input by the user
NewString	STRING	The string formed/made/created//output Allow: if "by the user" added

[1]

[1]

[1]

[1]

Note: Correct (identifier + the data type + description) needed to score

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```

(ii) // main program
INPUT MyString
ChangedString ← RemoveSpaces(MyString) (1)
OUTPUT ChangedString

// function definition (1)
FUNCTION RemoveSpaces(InputString : STRING)
RETURNS STRING (1)
    DECLARE i :/AS INTEGER } (1)
    DECLARE j :/AS INTEGER }
    DECLARE NextChar :/AS CHAR } (1)
    DECLARE NewString :/AS STRING }

    NewString = "" (1)

    j ← CharacterCount(InputString)
    FOR i ← 1 TO j
        NextChar ← OneChar(InputString, i)
        IF NextChar <> " "
            THEN
                // the & character joins together two strings
                NewString ← NewString & NextChar
            ENDIF
    ENDFOR

    RETURN NewString //
RemoveSpaces ← NewString
ENDFUNCTION

```

(1)

(1)

only awarded if follows  
the previous mark

[Max 7]

- 7 (a) (i) 165 [1]
- (ii) "YES" Quotes optional [1]
- (iii) 9 [1]
- (iv) 83 [1]



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(b) (i) Use of correct identifiers only to score

*Declaration/Commenting of variables*

```
MyMessage As String
EncryptString As String
i As Integer
NextNum As Integer
```

At least two variables correctly documented [1]

*Input of string ...*

Correct syntax (for both prompt and assignment) and ...  
Uses the MyMessage identifier [1]

EncryptString set to 'empty string' [1]

Note: Must suggest 'empty' string

*For loop ...*

FOR – NEXT keywords // (Python) correct indentation [1]

Correct start/end boundaries [1]

Note: the end boundary must use the language length  
function/method //alternative Python syntax

Isolate single character [1]

Use of language functions to calculate new number and ....  
Assigned to NextNum [1]

Conversion of NextNum to a character and concatenated  
to EncryptString [1]

Correct syntax for output of EncryptString [1]

[MAX 8]

**SAMPLE CODE**

**PYTHON**

```
MyMessage = input("Enter message : ")
EncryptString = ""
for i in range(0, len(MyMessage)) :
    NextNum = ord(MyMessage[i]) + 3
    EncryptString = EncryptString + chr(NextNum)
print(EncryptString)
```

**Alternative solution:**

```
MyMessage = input("Enter message : ")
EncryptString = ""
for NextChar in MyMessage :
    NextNum = ord(NextChar) + 3
    EncryptString = EncryptString + chr(NextNum)
print(EncryptString)
```

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### VB

```

Dim MyMessage, EncryptString As String
Dim NextNum, i As Integer
Console.Write("Enter message : ")
MyMessage = Console.ReadLine()
EncryptString = ""
For i = 1 To Len(MyMessage)
    NextNum = Asc(Mid(MyMessage, i, 1)) + 3
    EncryptString = EncryptString + Chr(NextNum)
Next
Console.WriteLine(EncryptString)

```

#### Alternatives:

```

GetChar(MyMessage, i)
MyMessage.Substring(i, 1)

```

**Allow:** Use of InputBox and MsgBox

#### Alternative solution :

```

Dim MyMessage, EncryptString As String
Dim NextNum, i As Integer
Console.Write("Enter message : ")
MyMessage = Console.ReadLine()
EncryptString = ""
For i = 0 To Len(MyMessage) - 1
    NextNum = Asc(MyMessage.Chars(i)) + 3
    EncryptString = EncryptString + Chr(NextNum)
Next
Console.WriteLine(EncryptString)

```

### PASCAL

```

var
    MyMessage, EncryptString : string;
    NextNum, i : integer;
begin
    write('Enter message : ');
    readln(MyMessage);
    EncryptString := '';
    for i := 1 to length(MyMessage) do
        begin
            NextNum := ord(MyMessage[i]) + 3;
            EncryptString := EncryptString + chr(NextNum);
        end;
    writeln(EncryptString);
end.

```

- (ii) For each/every character .... [1]  
 A replacement character is 'calculated' from its ASCII value // or by example ... [1]